REMARKS

I. Status Summary

Claims 1, 3-12, and 15 are pending in the present application. With this amendment, claim 1 is being amended. Claims 6-10 are being cancelled. Therefore, upon entry of this Amendment, claims 1, 3-5, 11, 12, and 15 will be pending.

Support for these amendments can be found throughout the original application as filed. For example, support for the amendments to claim 1 can be found in original claims 6-10 now cancelled. Applicant submits that no new matter is injected into the application by way of the amendments. Reconsideration of the present application as amended based on the arguments set forth hereinbelow is respectfully requested.

II. Claim Rejections - 35 U.S.C. § 102

Claims 1, 3-12 and 15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,917,682 to Vanderbauwhede (hereinafter, "Vanderbauwhede"). This rejection is respectfully traversed.

Claim 1 recites a transceiver for a transmission and reception signal which can be transmitted via a signal line having a particular line impedance. Further, claim 1 recites a line driver for driving a transmission signal via the signal line. Claim 1 recites that the line driver has a synthesized output impedance. Further, claim 1 recites a programmable analog echo cancellation filter for signal suppression for an echo signal brought about by the transmission signal. Claim 1 also recites a hybrid circuit for connecting the analog echo cancellation filter to the signal line. Claim 1 has been

amended to recite that the hybrid circuit includes a first two-pole connection connected to the output of the line driver, a second two-pole connection for connection to the signal line, a third two-pole connection connected to the analog echo cancellation filter, series resistors being connected, in series with the line impedance of the signal line, between the first two-pole connection and the second two-pole connection, and a first and a second series-connected crosscoupling resistor respectively connected between the first two-pole connection and the second two-pole connection. Claim 1 has been amended to recite that the third two-pole connection of the hybrid circuit for connecting the echo cancellation filter is tapped off between the series-connected crosscoupling resistors. Claim 1 has also been amended to recite that the resistance values of the resistors connected in the hybrid circuit satisfy the following equation:

$$R2 = R3 \cdot \frac{R_{SYN}}{R1 + R_{SYN}}$$

where R1 is the resistance value of the series resistors, R2 is the resistance value of the first crosscoupling resistor, and R3 is the resistance value of the second crosscoupling resistor, and where R_{SYN} is the synthesized output impedance of the line driver. Claim 1 recites a reception filter for filtering a signal received via the signal line. Further, claim 1 recites a subtraction circuit which subtracts from the filtered output signal of the reception filter the transmission signal simulated by the echo cancellation filter to generate a reception signal liberated of the echo signal.

Applicant respectfully submits that Vanderbauwhede fails to disclose each and every feature recited by amended Claim 1 of the present application. Claim 1 is

directed to a transceiver having functionality for echo cancellation. The transceiver transmits signals over a transmission line and receives signals from the transmission line. The received signals are filtered with a reception filter **22** and then passed on to a reception signal processing circuit **25**. When signals are transmitted over the transmission line, then the transmission signals also enter the reception filter **22**, thus affecting the reception signal. In order to avoid this, an echo cancellation filter **15** and subtraction circuit **19** are provided. The subtraction circuit **19** subtracts this simulated transmission signal from the reception signal. Accordingly, the transmission signal is cancelled out and does not affect the reception signal.

The problem of the reception signal also entering the echo cancellation filter as with the prior art configuration shown in Figure 1 is solved by providing the hybrid circuit **11** having resistors with the resistance values as recited in claim 1 of the present application, and tapping of the two-pole connection to the echo cancellation filter at a specific point in this hybrid circuit.

The signal received by the transceiver **1** on the line interface **2a**, **2b** is a factor of F smaller at the output of the line driver **6** (that is, at the two-pole connection **10a**, **10b**) than at the line interface **2a**, **2b** (that is, at the two-pole connection **12a**, **12b**), where F is:

$$F = \frac{R_{SYN}}{(R_{SYN} + R1\ )}$$

For this, the assumption is made that the resistance values of the series resistors **R1**, **R1'** are much smaller than the resistance values of the cross-coupling resistors **R2**, **R2'** and **R3**, **R3'**.

The signal that is output from the hybrid circuit at the third two-pole connection **14a**, **14b** is entirely liberated of reception signal components if the resistance values of the resistors in the hybrid circuit satisfy the relationship recited in claim 1, namely:

$$R2 = R3 \cdot \frac{R_{SYN}}{R1 + R_{SYN}}$$

Accordingly, signals received from the transmission line are not passed into the echo cancellation filter **15**. It is important to note that this applies for any impedance values of the line impedance Z_{LINE}.

As set forth in the last response, Vanderbauwhede discloses a device comprising a hybrid circuit that is integrated in the analog front end of a communication line **17**. (See Vanderbauwhede, Figures 1 and 2.) Further, Vanderbauwhede discloses that the hybrid circuit comprises tunable passive elements, the values of which are controllable. Vanderbauwhede also discloses that the hybrid circuit comprises a digital control means (e.g., a microprocessor) for controlling the tunable passive elements. (See Vanderbauwhede, column 1, lines 53-60.) The passive elements can be tuned by the control register of a microprocessor, which connects or disconnects small resistors or capacitors, in order to permit a discrete controlling of the resistance or capacitance values. (See Vanderbauwhede, column 3, lines 18-25.) The hybrid circuit is a differential impedance bridge. The best echo return loss is obtained when the bridge is

in equilibrium, which is the case when the TX return loss gain is equal to zero. (See Vanderbauwhede, column 4, lines 15-22.) The hybrid TX return loss gain is calculated by the microprocessor, and the microprocessor tunes the tunable passive elements in the hybrid circuit, adapting them until a value of zero is obtained. Therefore, the tunable passive elements reach their optimal value through this adaptation. (See Vanderbauwhede, column 4, lines 58-67.)

Applicant maintains the position that the basic functionality of Vanderbauwhede is quite different from that of the transceiver recited in claim 1 of the present application. Most importantly, Vanderbauwhede does not disclose the structure and the resulting functionality for simulating the transmission signal transmitted by the transceiver with an echo cancellation filter and then subtracting that simulated signal from the actually received reception signal. In other words, Vanderbauwhede does not disclose a subtraction circuit which subtracts the transmission signal simulated by the echo cancellation filter from the filtered output signal of the reception filter.

The Examiner contends that the components of Figure 2 of Vanderbauwhede form a filter going into the receive amplifier and function to subtract the transmit from the receive. First, the subtraction circuit as recited in claim 1 of the present application does not "subtract the transmit from the receive," but rather subtracts from the filtered output signal of the reception filter the transmission signal simulated by the echo cancellation filter. Second, there is no component in Figure 2 of Vanderbauwhede that appears to act as a subtraction circuit. Element **14** most certainly does not correspond to a subtraction circuit, since it is denoted to be a current-to-voltage converter. The

function of a current-to-voltage converter is to convert a current value into a voltage value, and not to subtract one signal from another.

Furthermore, in the hybrid circuit according to Vanderbauwhede, the resistors of the hybrid circuit are not dimensioned as recited in amended claim 1 of the present application. As explained above, by dimensioning the resistors as recited in claim 1, reception signal components can be removed entirely from the input into the echo cancellation filter, regardless of the impedance value of the line impedance $\mathbf{Z}_{LINE}$. By contrast in Vanderbauwhede, the value of the cross-coupling resistance $\mathbf{Z}_b$ is given as

$$Z_b = [1/kZ_{tr+li} + 1/k(2R_t/2n^2)]^{-1},$$

(See Vanderbauwhede, column 4, line 50). Accordingly, the cross-coupling resistance $\mathbf{Z}_b$ is dependent of the line impedance $\mathbf{Z}_{tr+li}$. This dependence is also the reason why the impedance $\mathbf{Z}_b$ is given as a tuneable impedance (See Vanderbauwhede, Figure 3). By contrast, the cross-coupling resistances according to claim 1 of the present application do not have to be provided as tuneable resistances.

For these reasons, applicant respectfully submits that the rejection of claim 1 under 35 U.S.C. § 102(e) should be withdrawn and the claim allowed at this time.

Claims 3-5, 11, 12 and 15 depend upon claim 1. Therefore, claims 3-5, 11, 12 and 15 include the features recited by claim 1. Accordingly, for the reasons set forth above with respect to claim 1, applicant respectfully submits that the rejection of claims 3-5, 11, 12 and 15 under 35 U.S.C. § 102(e) should be withdrawn and the claims allowed at this time.

CONCLUSION

In light of the above Amendments and Remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any additional fees associated with the filing of this correspondence to Deposit Account No. **50-0426**.

Respectfully submitted,

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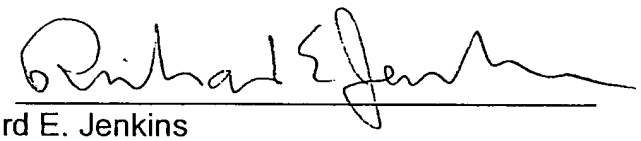
By: 
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